

1 INTRODUCTION

The U.S. Army Corps of Engineers (Corps) has prepared this Columbia River Channel Improvements Project (the Project) Biological Assessment (BA) to evaluate potential effects on federally listed threatened and endangered salmonids that may be associated with proposed channel improvements. This section of the BA provides background information on the Project by summarizing the regulatory context for the reconsultation process and by introducing the major features of this assessment. The project is a multipurpose action consisting of navigation improvements and ecosystem restoration features. The Mouth of the Columbia River (MCR) Project (River Mile [RM] -3 to RM +3) is a separately authorized project and not covered in this BA.

1.1 Channel Improvements Project Background

1.1.1 History of Channel Improvements

The proposed deepening of the lower Columbia River navigation channel to 43 feet in depth has an extensive history and is part of the ongoing evolution of marine commerce within the Columbia River Basin. This section provides the background and context for the proposed action and for the analysis that has been performed to evaluate possible effects from that action.

Since the late 1800s, the Corps has been responsible for maintaining navigation safety on the Columbia River. During that time, the Corps has taken many actions to improve and maintain the navigation channel. The channel has been dredged periodically to make it deeper and wider, as well as annually for maintenance. To improve navigation and reduce maintenance dredging, the channel has also been realigned and hydraulic control structures, such as in-water fills, channel constrictions, and pile dikes, have been built. Pile dikes have been used to provide bank protection, channel stabilization, and channel constriction (with and without sand fill) and to concentrate flow. (Pile dikes are permeable groins extending into the river, and consist of two rows of untreated timber piling driven on 2 ½-foot centers alternately placed on each side of horizontal spreader piles. The pilings are driven to refusal, or to a specific penetration depending on location, and securely bolted to the spreader piles. Stone is placed along the pile dike and around the outer end for protection from scour.)

In 1878, Congress authorized the Columbia River navigation channel project and directed the Corps to establish and maintain a 20-foot minimum channel depth. Maintaining this depth required dredging in only a few shallow reaches of the river where the natural controlling depths were in the 12- to 15-foot range (Corps, 1999a). Pile dike construction in the lower Columbia River was initiated in 1885 at St. Helens Bar where natural depths of 15 feet were increased to 25 feet. Other early dikes were constructed at Martin Island Bar and Walker Island Bar in 1892-93.

In 1899, Congress increased the authorized navigation channel depth to 25 feet. The maintenance dredging associated with this increase was still limited to a few particularly shallow reaches where sporadic dredging was conducted as needed (Corps, 1999a).

In 1912, the navigation channel depth was increased to 30 feet. At that time, the navigation channel width was established at 300 feet. Increasing the channel depth to 30 feet resulted in the need for increased maintenance dredging to ensure that authorized navigation depths were safe, were available for shipping, and addressed shoaling associated with dredging (Corps, 1999a).

In 1930, Congress increased the authorized depth to 35 feet. The navigation channel width was also increased to 500 feet and was realigned in certain reaches. The channel deepening to 35 feet was

completed in 1935. Most of the present-day dike system was built in the periods 1917-23 and 1933-39. From 1936 to 1957, Congress authorized additional channel alignment adjustments that added to the dredging requirements. During this period, dredging averaged 6.7 million cubic yards (mcy) per year. By 1958, the channel alignment had stabilized, but maintenance dredging was augmented to increase the advanced maintenance depth from 2 feet to 5 feet in areas of active shoaling. This “advance maintenance dredging” approach enhances navigational safety by maintaining the authorized channel depth (which is necessary to ensure adequate underkeel clearance) during periods of channel shoaling that occur between maintenance dredging events. Advance maintenance dredging in the navigation channel is ongoing.

The current 40-foot navigation channel was authorized in 1962; construction took place in stages between 1964 and 1976. The channel is 40 feet deep and 600 feet wide from RM 3.0 to RM 105.5, and 35 feet deep and 500 feet wide from RM 105.5 to 106.5 (from the Burlington Northern and Santa Fe Railway bridge to the Interstate 5 bridge). The 40-foot navigation channel generally follows the deepest part of the natural river channel. Most of the channel is naturally deeper than 40 feet; however, shoals tend to form in channel reaches where natural depth is less than 40 feet. Since 1976, maintenance dredging has averaged approximately 5.5 mcy per year (excluding emergency dredging related to the 1980 eruption of Mount St. Helens) (Corps, 1999a). Between 1957 and 1967, 35 new pile dikes were built. The existing dike system consists of 256 dikes, totaling 240,000 linear feet.

A period of riverbed adjustment has followed each navigation channel improvement. Each channel deepening may be viewed as a low-intensity disturbance that affects various reaches of the river. The riverbed slowly adjusts the side slopes adjacent to each new dredge cut. It typically takes several years for the side slopes to approach a dynamic equilibrium with the deepened channel (Corps, 1999a). Localized maintenance dredging has historically increased throughout the affected river reaches during these adjustment periods. The amount of dredging needed to maintain the navigation channel during these adjustment periods has depended partly on the magnitude of the disturbances to the pre-existing riverbed.

Because of the frequency and variation of channel improvements, there has not been a clear correlation between channel depth and maintenance dredging volumes. As noted above, the average annual maintenance dredging volumes for the 30-, 35-, and 40-foot channels were from 5.5 to 6.7 mcy per year (Corps, 1999a).

In December 1999, Congress authorized the deepening of the Columbia and Lower Willamette Rivers Federal Navigation Channel to 43 feet (Section 101(b)(13) of the Water Resource Development Act of 1999). The authorized plan would modify the existing federal navigation project for the Columbia and Willamette Rivers and provide for construction of ecosystem restoration features. Portions of the Lower Willamette River have been designated as a federal National Priorities List (NPL) site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As discussed in Section 6.4, construction of the Willamette River features has been deferred pending study and selection of an appropriate remedy for cleanup under CERCLA. Following selection of the remedy, the Willamette River features will be re-evaluated and consulted on separately.

1.1.1.1 43-foot Channel Improvements Project

In the late 1980s, several lower Columbia River ports requested that the Corps consider additional deepening of the navigation channel. On August 3, 1989, the U.S. House of Representatives’ Committee on Public Works and Transportation authorized the Corps to conduct a study of improvements for the navigation channel of the lower Columbia River. Specific guidance for conducting the feasibility study phase was provided in the Energy and Water Appropriation Act of Fiscal Year 1994, Public Law 103-126. The guidance limited the scope of the study to channel depths of no greater than 43 feet, as had been

requested by the Sponsor Ports (Astoria,¹ Portland, and St. Helens in Oregon and Kalama, Longview, Vancouver, and Woodland in Washington). The first phase of this study was a reconnaissance study. The second phase, the feasibility study, began in 1994.

The Corps, with the cooperation of the lower Columbia River Ports completed the 5-year feasibility study, including an Environmental Impact Statement (EIS), in August 1999. Congress authorized construction of the project during its 1999 session, although additional funds must still be appropriated before the channel improvement work can begin. The recommended plan in the Final Environmental Impact Statement (FEIS) consists of the following:

- The existing 600-foot-wide, 40-foot-deep navigation channel would be deepened from -40 feet to -43 feet Columbia River Datum (CRD), from RM 3 to RM 106.5 on the Columbia River, including advanced maintenance dredging for overwidth and overdepth in the reaches where this practice is currently performed in the maintenance program.
- The existing 600-foot-wide, 40-foot-deep navigation project channel would be deepened from -40 feet to -43 feet CRD, from RM 0 to RM 11.6 on the Willamette River.²
- Three of the existing five turning basins on the Columbia River (located at RM 15, 73.5, and 101.5, respectively) would be deepened to -43 feet CRD.
- The three turning basins located at RM 4, 10, and 11.7 on the Willamette River would be deepened to -43 feet CRD.
- A total of 29 upland disposal sites (with a total land area of 1,681 acres), three beach nourishment sites, and one ocean disposal site would be required for the disposal of construction materials and subsequent channel maintenance dredged material. Fourteen of the upland disposal sites, totaling 1,025 acres, are currently in use, as are the three beach nourishment sites.
- Ecosystem restoration features include the use of a combined pump/gravity water supply for restoring wetland and riparian habitat at Shillapoo Lake. Tidegate retrofits with fish slides for salmonid passage would be installed at selected locations along the lower Columbia River. Connecting channels would be constructed at the upstream end of Walker-Lord and Hump-Fisher Islands to improve fish access to embayment rearing habitat for juvenile salmonids.
- Environmental mitigation features would be constructed on a total of 740 acres of land located at the Woodland Bottoms, Martin Island, and Webb mitigation sites.

Only one (deep water site) of the two authorized ocean disposal sites will be used for this Project. As discussed in detail in Section 8, additional ecosystem restoration features have been incorporated into the Project as a result of the informal consultation. These features would be constructed using several different means. The Lois Island Embayment and Miller-Pillar habitat restoration efforts would be constructed via placement of dredged material to attain target depths at each location. Miller-Pillar would also require construction of a pile dike field (five pile dikes) to hold material in place. The Bachelor Slough Restoration would entail deepening an existing side channel by dredging and disposal of material either upland or in or adjacent to the navigation channel. Upland disposal of Bachelor Slough sediments would allow for the development of riparian forest habitat with the Endangered Species Act (ESA)

¹ Although originally part of the cooperating Columbia River Ports, the Port of Astoria is no longer a project sponsor.

² As discussed in Section 6, the Willamette River portion of the authorized improvements will be deferred.

Critical Habitat zone for Snake River salmonids. Purple loosestrife control would entail use of an integrated pest management approach, e.g., introduction of biological control agents, use of herbicides, and/or mechanical pulling of this exotic plant.

The interim restoration action at Tenasillahe Island would encompass improvements to existing tidegates and possibly placement of water control structures at inlets to interior sloughs to improve fish accessibility and water circulation through the sloughs. Over the long term, improvements at Tenasillahe Island could entail breaching of exterior dikes to return tidal circulation to 1,778 acres. The long-term action is contingent upon delisting of Columbia white-tailed deer and must be compatible with the purposes and goals of the refuge. The last restoration proposal pertains to the translocation of Columbia white-tailed deer to Cottonwood-Howard Island near Longview, Washington. No habitat restoration is required for this latter action.

This BA also addresses maintenance associated with the Project. Maintaining the 43-foot navigation channel requires annual ongoing maintenance to address shoaling action similar to the existing 40-foot project.

1.1.2 Project Need

The proposed Project is needed to maintain the existing trade base and restore ecosystem function. The identity and vitality of the Pacific Northwest is inextricably linked to the Columbia River Basin system for commerce and shipping.

1.1.2.1 Economic Importance of Channel Improvements

The Columbia River is a major gateway for waterborne cargo for the Pacific Northwest region and the United States. More than 35 million tons of cargo are shipped annually on approximately 2,000 ocean-going vessels via the ports of Kalama, Longview, and Vancouver in Washington, and Portland and St. Helens in Oregon. In 2000, cargo valued at \$14 billion was shipped via lower Columbia River ports. In addition to the income generated by activities related to the navigation channel, the Corps has determined that channel deepening would result in national annual savings of \$34.4 million in transportation costs (Corps, 1999a).

The lower Columbia River is the second largest grain-shipping waterway in the world, surpassed only by the Mississippi River. The Columbia River transportation corridor serves as a funnel for cargo moving from more than 40 states, which is then shipped from Columbia River ports (PIERS, 2001).

Since the last improvement to the Columbia River navigation channel, authorized in 1962, the volume of cargo carried by deep-draft vessels to and from Columbia River ports has tripled. During the same period, the average tonnage per vessel has also tripled, while the number of deep-draft vessels calling at Columbia River ports declined slightly.

Over the past 20 years, an increasing share of the Columbia River cargo tonnage has been carried on vessels that are Panamax class (the largest size vessels that can transit the Panama Canal) or larger. These larger vessels have design drafts that, after allowing for underkeel clearance requirements, exceed the depth allowed by the 40-foot channel; consequently, these ships must often come into the Columbia River ports "light-loaded" (i.e., only partially loaded). Currently, more than 70 percent of the vessels deployed in the transpacific container trade are constrained by the 40-foot channel depth. This amount would be reduced to 39 percent with a 43-foot channel.

1.1.2.2 Regional Benefits of Channel Improvements

The Columbia River navigation channel serves shippers located throughout the Pacific Northwest region. Regional growers, producers, and manufacturers use Columbia River ports to transport their goods to world markets. These shippers realize lower shipping costs by using Columbia River ports as opposed to more distant alternative ports. Marine shipping is an important industry in the lower Columbia River region. The Port of Portland estimates that approximately 40,000 jobs depend on Columbia River seaport activity. These jobs pay \$46,000 per year per employee on average. The Port of Portland estimates Columbia River seaport activity generates \$2 billion in business revenues and more than \$200 million in state and local taxes each year. By lessening or removing the channel depth constraints for Columbia River seaport activity, the Project will continue to support this vital section of the regional economy.

1.1.2.3 Ecosystem Restoration

As discussed in detail in Section 2, the Columbia River system has been substantially altered over the last 100 years in a manner that has significantly degraded ecosystem functions. This Project responds to the well-demonstrated need for ecosystem restoration and, as discussed in Section 8, incorporates additional restoration actions.

1.2 Project Description

1.2.1 Project Actions

Details of the proposed actions to be undertaken are summarized in Section 3 of this BA. The selective dredging needed to deepen the 600-foot-wide Columbia River navigation channel to 43 feet from the current 40 feet would be done from RM 3.0 near the mouth of the Columbia River up to RM 106.5 near the eastern end of Hayden Island near Portland. Because significant reaches of the lower Columbia River and navigation channel are naturally deeper than 43 feet, only specific areas that are currently less than 43 feet deep will require dredging. These areas are identified in Figure 1-1 for the whole channel improvements project area. The shallower reaches that would be subject to deepening activities represent approximately 3.5 percent of the total river area between RM 3 and RM 106.5, or 54 percent of the existing navigation channel (Daly, pers. comm., 2001).

Figure 1-1: Navigation Channel Improvements Project Area

1.2.2 Study Area Considered in this Report

The National Marine Fisheries Service (NMFS), the U.S. Fish & Wildlife Service (USFWS), and the Corps have agreed to define the study area broadly for the Project BA. The action area is defined to extend beyond the actual location of proposed activities³ to include areas that may potentially be directly or indirectly affected by the Project (50 CFR Section 402.02). The action area includes the following:

- A bank-to-bank run of the river from Bonneville Dam down to the river's mouth, which includes adjacent port terminals and berths and certain ecosystem restoration and mitigation sites, as well as from the river mouth extending 12 miles out into the Pacific Ocean in a fan shape.
- Upland disposal, ecosystem restoration, and mitigation sites.

All potential direct and indirect effects resulting from project activities in the action area are encompassed in this analysis, as are cumulative effects and effects from interrelated and interdependent activities. Although 11.6 miles of the lower Willamette River area were originally addressed in the FEIS and included in the Congressional authorization, the Willamette River is not included in this BA. It will be addressed in a separate BA after resolution of sediment cleanup issues associated with its designation as a federal NPL site under CERCLA.

For purposes of discussion, the action area has been divided into three general habitat or reach types. The first is riverine, which begins at Bonneville Dam and runs downstream to the start of the estuary at approximately RM 40. The second is estuarine and runs from RM 40 downstream to RM 3.⁴ The third is the river mouth, which starts at a wide area at RM 3 and encompasses the outer boundary of the deep water site (approximately 12 miles beyond the project area), in a fan shape (Figure 1-2).

Within the three general reach types, the graphics in this document use the same reach segment breakdown as in the Corps' FEIS and Dredged Material Management Plan (DMMP). The reach numbering system used in the FEIS and DMMP runs from Reach 1 at RM 106.5 to Reach 7 at RM 3. However, the previous Corps' documents do not discuss the expanded Bonneville and river mouth reaches; consequently, reach numbers were not assigned to those areas. To avoid re-numbering the original reaches, the Bonneville reach has been designated Reach A, while the river mouth reach has been designated Reach B (Figure 1-2).

³ The location of the proposed project activities will be limited to dredging selected areas from RM 3 to RM 106.5, upland dredged material disposal in selected pre-approved upland and shoreline locations, and dredged material disposal in selected flowlane and ocean locations. (Details of these activities and locations are provided in Section 3.)

⁴ Although the entire study area could be described as estuary because of tidal influence, only the portion influenced by increased salinity (RM 3 to RM 40) is referred to as estuary in this document.

Figure 1-2: Action Area

1.3 Environmental Regulatory Context for Channel Improvements

Informal consultation was reinitiated and this BA was prepared within a complex regulatory context. The following discussion is intended to explain the statutory basis for preparing the document and the broader regulatory context in which it is occurring.

1.3.1 Background on Endangered Species Act Consultation

Section 7 of the ESA of 1973 requires that federal agencies ensure that their actions are “not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat” [16 USC Section 1536 (a)(2)]. NMFS and USFWS share responsibility for the administration of the ESA, and federal agencies must consult with NMFS and USFWS if their activities could affect listed species or their habitat. In the Columbia, Willamette, and Snake Rivers, several fish species are listed as threatened and endangered under the ESA, with more awaiting listing determinations. USFWS has jurisdictional responsibility for the survival and recovery of listed fish species that spend the majority of their lives in freshwater. NMFS has jurisdictional responsibilities for listed fish species that spend the majority of their lives in saltwater.

A BA is prepared to “evaluate the potential effects of the action on listed and proposed species and designated and proposed critical habitat” (50 CFR Section 402.12). In preparing a BA, the federal agency uses the best available information to evaluate the potential effects of the action on listed species within the action area. Based on the effects that are identified through this process, the federal agency will determine whether formal consultation is necessary. When the federal agency completes its BA, it is submitted to NMFS and/or USFWS for review and formal consultation on whether the action will jeopardize the continued existence of the listed species or result in the destruction or adverse modification of their critical habitat. NMFS and/or USFWS document their findings and recommendations in a Biological Opinion (BO).

1.3.2 Reinitiation of ESA Consultation

The ESA consultation procedure for a federal action may be reinitiated if new information reveals potential effects to listed species not previously considered during an earlier consultation (50 CFR Section 402.16). This BA was prepared by the Corps in response to NMFS’s request to reinitiate consultation on listed species potentially affected by the Project. This BA addresses 15 fish runs. It includes 13 listed fish runs, 1 fish run proposed for listing, and 1 candidate fish run⁵ (Table 1-1). Thirteen of these 15 fish runs were evaluated during the previous consultation process.

⁵ A fish run, as used in this BA, is a population segment of a salmonid species that forms an evolutionarily significant unit or distinct population segment as defined by the NMFS and USFWS.

Table 1-1: Fish Runs Addressed in This Biological Assessment

Responsible Agency	Runs	Listing Status
NMFS	Snake River fall chinook salmon (<i>Oncorhynchus tshawytscha</i>) ¹	Threatened
	Snake River spring/summer chinook salmon (<i>Oncorhynchus tshawytscha</i>) ¹	Threatened
	Snake River sockeye (<i>Oncorhynchus nerka</i>) ¹	Endangered
	Snake River steelhead (<i>Oncorhynchus mykiss</i>) ¹	Threatened
	Upper Willamette River chinook (<i>Oncorhynchus tshawytscha</i>) ¹	Threatened
	Upper Willamette River steelhead (<i>Oncorhynchus mykiss</i>) ¹	Threatened
	Upper Columbia River steelhead (<i>Oncorhynchus mykiss</i>) ¹	Endangered
	Lower Columbia River steelhead (<i>Oncorhynchus mykiss</i>) ¹	Threatened
	Lower Columbia River chinook salmon (<i>Oncorhynchus tshawytscha</i>) ¹	Threatened
	Upper Columbia River spring chinook salmon (<i>Oncorhynchus tshawytscha</i>) ¹	Endangered
	Columbia River chum salmon (<i>Oncorhynchus keta</i>) ¹	Threatened
	Middle Columbia River steelhead (<i>Oncorhynchus mykiss</i>) ¹	Threatened
USFWS	Bull trout (<i>Salvelinus confluentus</i>)	Threatened
	Coastal cutthroat (<i>Oncorhynchus clarki clarki</i>) ¹	Proposed Threatened
NMFS	Lower Columbia River/Southwest Washington coho ² (<i>Oncorhynchus kisutch</i>)	Candidate

¹ Runs previously addressed in the earlier BA and supplements.

² On July 25, 1995, NMFS designated this coho evolutionarily significant unit (ESU) as a candidate for listing. Although not officially listed as threatened or endangered under the ESA, coho are included here because federal agencies have the responsibility to consider potential effects from the proposed Project on candidate species for planning purposes.

The ESA consultation process for the Project before reinitiation of consultation is described below.

1.3.3 Other Federal Regulatory Compliance

As suggested by the Council on Environmental Quality guidelines, this ESA consultation and associated documentation have been integrated into the ongoing National Environmental Policy Act (NEPA) compliance effort to streamline the process (40 CFR Section 1506.4). The Corps intends to supplement the NEPA document, completed in August 1999, to incorporate modifications to the proposed action described in this BA.

Future requirements before construction include Section 401 Clean Water Act (CWA) certification and Coastal Zone Management Act (CZMA) determination for both Oregon and Washington, and a Record of Decision under NEPA.

NMFS has recently defined essential fish habitat (EFH) for Pacific Coast salmonids within Amendment 14 to the Pacific Coast Salmon Plan, which was approved in September 2000 (NMFS, 2000). The important elements of salmon essential fish habitat (EFH) are 1) estuarine rearing, 2) early ocean rearing and 3) juvenile and adult migration. Important features of estuarine and marine habitat are 1) adequate water quality, 2) adequate temperature, 3) adequate prey species and forage food, and 4) adequate depth, cover, marine vegetation, and algae in estuarine and shoreline habitats. A separate EFH consultation is being conducted by the Corps and NMFS.

1.3.4 ESA Consultation History

In conjunction with preparation of the channel improvements feasibility study and the FEIS, the Corps initiated the earlier ESA consultation with NMFS in 1995 and with USFWS in 1997 (the Services) pursuant to 16 USC Section 1536(a). The Corps' consultations with the Services were conducted separately, and separate BAs were prepared for each of the two agencies. To provide the regulatory context for this BA, Figure 1-3 summarizes key events in the ESA consultation process from the Congressional authorization to study channel improvements in 1989 through the projected issuance of two Biological Opinions in 2002. The following sections briefly describe the previous consultation processes for each agency.

1.3.4.1 ESA Consultation with National Marine Fisheries Service

In 1995, the Corps initiated consultation with NMFS concerning potential effects on listed fish species in the proposed action area. The Corps completed a BA for NMFS review that assessed the potential effects of the Project on 12 of the listed species noted in Table 1-2 (Corps, 1999b). In addition, the FEIS for the Project (Corps, 1999a) incorporated by reference (Chapter 6, Section 6.7.2) the ESA determinations for marine mammals and sea turtles from the DMMP BA in their entirety as the two actions were considered identical relative to the listed species. For more detailed background information on these listed marine mammals and sea turtles, the reader should reference the DMMP BA.

During the course of the consultation, the Corps and NMFS engaged in significant dialogue regarding the project, including several workshops on salinity modeling and coordination of anticipated effects. The BA for fish species under NMFS jurisdiction was completed in April 1999. The BA determined that the proposed project "may affect but is not likely to jeopardize any of the listed stocks" (Corps, 1999b). From April to November 1999, NMFS and the Corps continued to consult regarding the potential effects stated in the BA, and the adequacy of the conservation measures to be included as "terms and conditions." In addition, on July 27, 1999, the Corps supplemented its initial BA to include Southwestern Washington/Columbia River coastal cutthroat trout (*Oncorhynchus clarki clarki*), which had recently been jointly proposed for listing as a threatened species by NMFS and USFWS.⁶ The Corps determined that the Project "may affect but is not likely to jeopardize" cutthroat trout, as it had for the other fish species assessed in the original BA (Corps, 1999c).

On December 3, 1999, based on several months of additional consultation with NMFS, the Corps amended its original BA to include performance of additional studies and conservation measures (Corps, 1999d). The BA amendment also included a proposal for monitoring and for reporting on restoration actions, study results, and project updates.

On December 16, 1999, NMFS issued a BO for the proposed Project. The BO determined that, based on the conservation measures proposed, the Project would not jeopardize the continued existence of the listed species found in the action area.

⁶ ESA jurisdictional responsibilities for the coastal cutthroat trout were transferred to USFWS on April 5, 1999. (See NMFS letter dated November 26, 1999, in Appendix A.)

Figure 1-3: Channel Improvements Project: ESA Consultation Timeline

On August 25, 2000, NMFS requested reinitiation of consultation and officially withdrew the December 16, 1999, “no-jeopardy” BO. NMFS advised the Corps that, if consultation were reinitiated, NMFS would expect to work with the Corps to accomplish the following goals:

“1) Thoroughly assess the implications of any relevant new information; 2) reach agreement on the specific details of required studies and monitoring, and a schedule for conducting this work; 3) clarify expectations for the completion of restoration work; and 4) make any necessary refinements in the conservation measures, including terms and conditions, that are provided in the biological opinion to protect listed species and their designated critical habitat.”

The letter concluded that it was NMFS’s expectation that these tasks be performed within the reconsultation process prior to re-issuance of a BO for the Project (see Appendix A).

The August 25, 2000, letter identified a limited scope for reconsultation. These goals and the expectations for this BA have subsequently been modified during discussions among the Corps, NMFS, and USFWS. The agencies have agreed it is reasonable to treat the reconsultation as a new start and, accordingly, that the Corps should prepare a new BA. This called for re-evaluating project effects on the listed salmonid ecosystem. This BA presents all information necessary to accomplish the goals of reconsultation.

1.3.4.2 ESA Consultation with USFWS

The Corps also prepared a BA as part of the consultation with USFWS on listed terrestrial plants and wildlife within the action area. The consultation process with USFWS began in 1997 and included the terrestrial species listed in Table 1-2.

Table 1-2: Listed USFWS Plant and Wildlife Species (addressed in the 1997-99 Consultation)

Species	Status
Columbia white-tailed deer (<i>Odocoileus virginianus leucurus</i>)	Endangered
Marbled murrelet (<i>Brachyramphus marmoratus</i>)	Threatened
Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	Threatened
Brown pelican (<i>Pelecanus occidentalis</i>)	Endangered
Oregon silverspot butterfly (<i>Speyeria zerene hippolyta</i>)	Threatened
Water howellia (<i>Howellia aquatilis</i>)	Threatened
Golden Indian paintbrush (<i>Castilleja levisecta</i>)	Threatened
Bradshaw’s lomatium (<i>Lomatium bradshawii</i>)	Endangered
Nelson’s checkermallow (<i>Sidalcea nelsoniana</i>)	Threatened
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Threatened – Proposed Delisting
Aleutian Canada goose (<i>Branta canadensis leucopareia</i>)	Delisted – Currently Monitored
Peregrine falcon (<i>Falco peregrinus</i>)	Delisted – Currently Monitored

This consultation on terrestrial species was completed in December 1999 and was not reinitiated; consequently in this BA, these species are only addressed to assess the new ecosystem restoration and research features.

The Corps submitted the initial BA addressing plant and wildlife species to USFWS in early 1998. The BA considered potential impacts from a variety of activities in a variety of locations. Based on discussions with USFWS during the informal consultation process, it was determined that it would be necessary for USFWS to conduct formal consultation and prepare a BO to evaluate whether contaminated

sediments would be affected by dredging and disposal operations and, if so, whether they would have an effect on listed bald eagles (see USFWS letter dated April 22, 1999, Appendix A).⁷

During the course of formal consultation, the Corps coordinated extensively with USFWS regarding conservation and mitigation measures that would be appropriate for implementation with the project. Based on the Corps' analysis and negotiated conservation and reasonable and prudent measures for bald eagles and Columbia white-tailed deer, the USFWS issued a BO on December 6, 1999, stating that the proposed project was not likely to jeopardize relevant listed species within its jurisdiction (USFWS, 1999). USFWS provided specific terms and conditions to minimize the Project's effects on bald eagles and Columbia white-tailed deer, which are still valid.

Subsequently, on December 7, 2000, USFWS informed the Corps of two additional listed species requiring consultation (see USFWS letter dated December 7, 2000, Appendix A). USFWS indicated that it had recently become aware of historical indications of bull trout presence within the Columbia River estuary. USFWS also noted that conferencing on the proposed coastal cutthroat trout should be reinitiated with USFWS because NMFS had withdrawn its BO that included coastal cutthroat trout, which was now regulated by USFWS. As discussed below, USFWS is participating in the reconsultation process to address potential impacts to bull trout and coastal cutthroat trout, which are addressed in this BA.

1.3.5 Reconsultation Process

Although the previous ESA consultations for this project addressed a number of terrestrial species, marine mammals, and aquatic species, this reconsultation process focuses primarily on the 15 fish runs listed in Section 1.3.2 and includes coastal coho. The goals of the reconsultation have been modified since NMFS initiated reconsultation with its August 25, 2000, letter. The goals of the reconsultation that the Services and the Corps have mutually developed are a re-evaluation of potential project impacts; an analysis of these potential effects within the framework of an ecosystem-based conceptual model; and development of compliance measures and monitoring conditions based on the effects analysis. In addition, the six Sponsor Ports⁸ have assisted the Corps as a nonfederal representative for both NMFS and USFWS consultations (see Corps letters dated October 16, 2000; October 27, 2000; May 21, 2001; and July 11, 2001, Appendix A).

To facilitate the overall goals of reconsultation, the Corps, the Services, and the Sponsor Ports retained Sustainable Ecosystems Institute (SEI), a public-benefit, science mediation group, to help frame scientific questions raised in connection with the proposed Project. SEI assembled a panel of seven nationally prominent technical experts to provide an independent, scientific, peer-review process to evaluate the potential environmental issues surrounding improvement of the navigation channel. For further information regarding the panel, see Appendix A. The SEI Panel members included the following:

- Dr. Martin Cody, University of California, Los Angeles
- Dr. Steven Bartell, The Cadmus Group, Inc., Oak Ridge
- Dr. Donald Boesch, Center for Environmental Sciences, University of Maryland, Cambridge
- Dr. Lawrance Curtis, Oregon State University, Corvallis
- Dr. Thomas Dunne, University of California, Santa Barbara

⁷ Although the USFWS letter focused on peregrine falcons, the issue was equally applicable to bald eagles, for which formal consultation was ultimately also performed.

⁸ The Sponsor Ports designated as nonfederal representative for the Project are Portland and St. Helens, Oregon, and Kalama, Longview, Vancouver, and Woodland, Washington.

- Dr. Charles Goldman, Tahoe Research Group Director, University of California, Davis
- Dr. Thomas Quinn, University of Washington, Seattle

During the SEI panel review process, additional analysis was completed and discussed at a series of five public workshops between March and August, 2001. These workshops addressed important physical and biological project issues, including:

- Historical and Existing Status of the Lower Columbia River Ecosystem
- Numerical Modeling of Hydraulic Parameters
- Salmonid Estuarine Ecology
- Sediments and Sediment Quality
- Monitoring and Adaptive Management

The Corps, the Services, Sponsor Ports, and other technical experts presented technical reports and technical status reviews at these SEI panel workshops. Summaries of the SEI public workshops, the technical presentations delivered at the workshops, and the panel's summary report of the findings are available on the SEI Columbia River project website, <http://www.sei.org/columbia/home.html>. In addition, since early spring 2001, the Corps, the Services, and the Sponsor Ports have engaged in regular reconsultation meetings to discuss and resolve technical issues associated with the proposed project and its potential effects and have conducted additional numerical modeling for the estuary. Models were run at both Oregon Health and Science University/Oregon Graduate Institute (OHSU/OGI) and the Corps' Waterways Experiment Station (WES).

1.3.6 Biological Assessment Organization

This document has been organized to present the essential features of a BA in a systematic framework outlining baseline conditions, the proposed action, and the effects of the proposed action on the baseline conditions. It also presents a discussion of the actions proposed to minimize any potential effects and for ecosystem restoration. Table 1-3 is a summary of the content of this BA.

Table 1-3: Columbia River Navigation Channel Improvements Project BA Section Outline

Section	Content
Executive Summary	
Section 1: Introduction	Background information about the project and its history to help clarify the intent and purpose of this document.
Section 2: Lower Columbia River Environmental Setting	Description of historical and current ecosystem conditions in the action area. Information in this section is organized according to the conceptual model presented in Section 5.
Section 3: Proposed Action	Description of the proposed types of activities necessary to complete the Project and the anticipated locations of those activities.
Section 4: Species and Habitat Information	Description of the way in which the species addressed in this document use the ecosystem described in Section 2.
Section 5: Current System Function	A conceptual model for understanding and evaluating how potential changes to the ecosystem will affect the listed species covered by this consultation.
Section 6: Effects Analysis	Evaluation of the potential effects from the activities described in Section 3 on the species and habitats identified in Section 4, and the Columbia River ecosystem described in Section 2, using the conceptual model described in Section 5.
Section 7: Actions Associated with Effects of Dredging and Disposal	Description of the compliance and monitoring actions that the Corps believes are necessary to ensure that any potential effects are minimized
Section 8: Ecosystem Restoration and Research Actions	Description of additional activities that the Corps will initiate to enhance conditions and assist with the restoration of the lower Columbia River ecosystem and their effects.
Section 9: An Ecosystem Approach to Project Implementation Using an Adaptive Management Process	Description of how actions proposed in Section 7 and additional activities proposed in Section 8 are linked to the conceptual ecosystem model in Section 5. The approach is outlined for implementing project activities and the Adaptive Management process.
Section 10: Determination of Effect	Effects determination for each of the listed aquatic species and, where relevant, terrestrial species as well as designated critical habitat.
Section 11: Abbreviations and Acronyms	List of abbreviations and acronyms
Section 12: Glossary	Glossary of terms
Section 13: References	List of references